

SECTION 12340 - LABORATORY CASEWORK - GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. The casework contractor shall furnish and install all products specified herein and in the complete casework package. The complete casework package consist of the following specification sections:
 - 1. Section 12309 - Laboratory Service Fixtures
 - 2. Section 12340 - Laboratory Casework - General Requirements
 - 3. Section 12345 - Metal Laboratory Casework and Fume Hoods
 - 4. Section 12346 - Wood Laboratory Casework
- B. This Section includes, but is not limited to, all materials, labor and equipment, complete with all anchors and related accessories, necessary to furnish, deliver and install:
 - 1. Epoxy Resin Countertops, Back Splashes, Sinks and Cup Sinks
 - 2. Peg Boards
 - 3. Hardware and Trim
 - 4. Stationary Cylinder Holder
- C. Although such work is not specifically shown or specified, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.
- D. This Section also includes all general requirements, applicable to this and all other Casework Specification Sections including, but not limited to:
 - Definitions
 - System description
 - Scope
 - Submittals
 - Quality assurance
 - Mock-up
 - Testing
 - Field measurements
 - Pre-installation conference
 - Delivery, storage and handling
 - Project conditions
 - Sequencing
 - Materials
 - Components
 - Finish and performance requirements
 - Examination, Installation, Adjusting, Cleaning and Protection Requirements
- E. Related Sections:
 - 1. Division 6 - Rough carpentry, blocking within walls to adequately support casework.

2. Division 7 - Sealants.
3. Section 11600 - Laboratory Equipment - General Requirements: Equipment Schedule.
4. Division 15 - Mechanical: service lines, plumbing connections, drains, traps, overflows, strainer, tailpieces, and fittings, ductwork, blowers, fume hood fans, and air flow monitors.
5. Division 16 - Electrical: Service lines, electrical rough-in, connections, receptacles, and covers.

1.02 DEFINITIONS

A. Service Fixtures:

1. Plumbing Service Fixtures: Gas cocks; ball turrets; hot, cold, and ultra-pure water goose-neck faucets; remote control valves; safety eyewash; shower heads; and other fittings.
2. Electrical Service Fixtures: Electrical convenience outlet boxes, electrical and data pedestals, single or duplex receptacles, switches: etc.
3. Other items which serve as functional part of equipment.

B. Service Lines:

1. Gas piping; hot, cold, and deionized water piping; drain and vent lines; fittings; and control and shut off valves; to carry respective services from building roughing-in floors and walls through equipment to service fixtures.
2. Conduit, junction boxes, conduit fitting, wire disconnect switches, fuses, and circuit breakers, to carry electrical services from building roughing-in outlets in floors, and walls through equipment to service fixtures.

C. Exposed:

1. As used in this Specification Section, "exposed" portions of woodwork include surfaces visible when doors and drawers are closed. Bottoms of woodwork more than 4 feet above finish floor are considered exposed. Visible surfaces in open casework or behind clear doors also are considered as exposed.

D. Semi-Exposed:

1. As used in this Specification Section, "semi-exposed" portions of woodwork include those members behind opaque doors, such as shelves, divisions, interior faces of ends, case backs, drawer sides, backs and bottoms, and back face of doors. Tops of cases 6'-6" or more above finish floor shall be considered semi-exposed. Bottoms of woodwork less than 4 feet above finish floor are considered semi-exposed. Semi-exposed portions of woodwork shall be of same species and same finish as the "exposed" portions.

1.03 SYSTEM DESCRIPTION

A. Design Requirements:

1. Manufacturer is responsible for:
 - a. Designing, engineering, fabricating, and installing system
 - b. Anchorage to structure
 - c. Modifications to meet specified requirements and maintain visual design concepts
2. Drawings are diagrammatic and are intended to establish basic dimension of units, sight lines, and unit profiles.

3. Provide concealed fastening wherever possible.
4. Attachment considerations: Account for site peculiarities, expansion and contraction movements, so there is no loosening, weakening, and fracturing, of connections between units and substrate.
5. Comply with UL 544 for electrically powered equipment.

B. Interface With Adjacent Systems:

1. Coordinate with mechanical service lines and ductwork.
2. Coordinate with electrical service lines.

1.04 SCOPE

- A. Furnish and install all cabinets and casework, including tops, ledges, supporting structures, fume hoods, laboratory sinks, cup sinks, and miscellaneous items of equipment as listed in these specifications, including delivery to the building, setting in place, leveling, scribing to walls and floors as required. Furnishing and installing all filler panels, knee space panels and scribes as shown on drawings.
- B. Furnish and deliver all utility service outlet accessory fittings, as listed in these specifications or as shown on drawings as mounted on the laboratory furniture. The above defined items shall be furnished unassembled with supply tank nipples and lock nuts, not attached, loose in boxes and properly marked for delivery to the mechanical contractor. All plumbing fittings shall be packaged separately and properly marked for delivery to the appropriate contractor.
- C. Furnish and deliver, packed in boxes for installation by the mechanical contractor, all drain troughs, overflows and sink outlets with integral tailpieces, which occur above the floor, and where these items are part of the equipment or listed in the specifications, or shown on the drawings. Integral tailpieces when required shall be in accordance with the manufacturer's standards. All tailpieces shall be furnished less the couplings required to connect them to the drain piping system.
- D. Furnish service strip supports where specified, and setting in place service tunnels, service tur-rets, supporting structures and reagent racks of the type shown on the details.

1.05 SUBMITTALS

- A. Product Data:
 1. Submit manufacturer's descriptive literature and product specifications for each product.
 2. Include data to indicate cabinet construction.
 3. Include information for factory finishes, chemical resistance ratings, hardware, glass, sealants, accessories, and other required components.
- B. Shop Drawings:
 1. Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 2. Indicate typical casework and countertop layout including dimensioned floor plans, sections and elevations, and service fixture holes locations.

3. Indicate enclosures, cabinets, hardware, service fixtures complete with numbers and item names, and details including construction kinds of cabinets, countertops, process tables, and other components.
4. Submit detail drawings of special accessory components not included in manufacturer's product data.
5. Indicate joints in countertop material.
6. Deviations: Highlight, encircle, or otherwise identify deviations from the Contract Documents on submittals.

C. Samples:

1. Work Surface Samples:
 - a. One sample of all top materials shown or called for, of sufficient size to perform finish requirement tests
 - b. Two pieces sealed and joined. Full depth of counter and 6 inches from each side of joint
2. Wood Finish Samples:
 - a. Include manufacturer's full range of samples for Architect's selection.
 - b. Size: 3" x 5"
3. Metal Casework Color Samples:
 - a. Include manufacturer's full range of colors for Architect's selection.
 - b. Architect will select casework components' color with no change in contract sum.
 - c. Provide sample of colors, as selected by Architect, on same metal from which casework will be fabricated
 - d. Size: 6" x 6"
4. Sample of all laboratory service fittings, locks, door pulls, hinges, and interior hardware.

D. Certification: Submit certifications specified in Quality Assurance article.

E. Qualification Data:

1. Submit manufacturer's and installer's qualifications verifying years of experience.
2. Include list of completed projects having similar scope of Work identified by name, location, date, reference names, and phone numbers.

F. Manufacturer's Instructions: Submit manufacturer's printed installation instructions.

G. Warranty:

1. Submit specified warranty in accordance with Division 1.
2. Warrant installed casework to be free from defects in material and workmanship for 1 year from date of substantial completion.
3. Warrant casework and components to be corrosion free for 3 years from date of substantial completion.
4. Include coverage against defects, which may arise during the warranty period except those which are caused by misuse.

1.06 QUALITY ASSURANCE

- A. Single Source Responsibility:
 - 1. Furnish units from one manufacturer for entire Project, unless otherwise acceptable to Architect.
 - 2. Provide casework modules as complete units, including countertop hardware, glazing, service fixtures and accessory items necessary for proper function.
 - 3. Provide each fume hood as complete units, including service fixtures specified in Section 12309 and accessory items necessary for operation.
- B. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this Section.
- C. Installer Qualifications: Acceptable to fabricator with documented experience on at least 5 projects of similar nature in past 5 years.
- D. Regulatory Requirements: Ensure flammable components comply with applicable portions of local, state, and federal codes, laws, and ordinances for flame spread and smoke developed indices.

1.07 PERFORMANCE REQUIREMENTS

- A. Base cabinets shall be constructed to support at least a uniformly distributed load of 200 lbs. per square foot of cabinet top area, including working surface without objectionable distortion of interference with door and drawer operation.
- B. Base cabinet corner gussets with leveling bolts shall support 500 lbs. per corner, at 1-1/2" projection of the leveling bolt below the gusset.
- C. Each adjustable and fixed shelf 4 ft. or shorter in length shall support an evenly distributed load of 40 lbs. per square ft. up to a maximum of 200 lbs., with nominal temporary deflection, but without permanent set. These requirements apply to all shelves including, but not limited to wall mounted shelves, shelves at island benches, and shelves inside cabinets.
- D. Drawer construction and performance shall allow 13-5/8" clear when in an extended position and suspension system shall prevent friction contact with any other drawer or door during opening or closing. All drawers shall operate smoothly, a minimum of 10,000 cycles with an evenly distributed load of 150 lbs.
- E. Swinging doors on floor mounted casework shall support 200 lbs. suspended at a point 12" from hinged side. Weight load test shall allow only a temporary deflection, without permanent distortion or twist. Door shall operate freely after test and assume a flat plane in a closed position.
- F. Utility Tables (4 legged) shall support 300 lbs. per square foot

1.08 MOCK-UP

- A. General: Comply with provisions of Division 1.
- B. The laboratory furniture manufacturer shall erect a laboratory furniture mock-up, in the location indicated by the Architect. All components utilized shall meet the requirements of the Drawings and Specifications.

- C. The manufacturer shall make adjustments necessary to meet minimum performance requirements and testing criteria specified, and obtain acceptance from Owner's Representative. Modifications to the mock-up shall be incorporated into the overall design of the project without change in contract sum. Do not proceed with shop fabrication or project installation until mock-up has been accepted by Architect.
- D. Accepted mock-up establishes minimum performance standards and quality for workmanship and materials for the Project. Mock-up shall remain in designated location until all furniture is installed and approved by the Owner's Representative. Approved mock-up will be incorporated into the project.

1.09 TESTING

- A. The laboratory furniture manufacturer shall be required to submit with their bid certified test reports on the laboratory casework finish, all work top materials to be furnished, and hoods. These test reports shall be performed by an independent nationally recognized testing laboratory and shall certify that the materials to be supplied will conform to the requirements of these specifications as well as testing procedures. Failure to include these test reports with the bid might be cause for rejection of the bidder and of the bid proposal.

1.10 FIELD MEASUREMENTS

- A. It is the laboratory furniture manufacturer's responsibility to verify all field measurements and that all equipment will fit through entry ways, corridors and door openings enabling a smooth flow of equipment to its proper location in the building.
- B. Drawings show arrangement and location of casework. If it is necessary to vary from arrangement shown, because of structural, mechanical, electrical or other considerations make such variations only after approval of Architect and at no additional expense to Owner.
- C. Measure all recesses and openings at buildings and provide all trim pieces, fillers, and closures, in sizes required.

1.11 PRE-INSTALLATION CONFERENCE

- A. Conduct pre-installation conference in accordance with Division 1.
- B. Convene pre-installation conference one week prior to commencing work of this Section.
- C. Attendance Required: Owner, Architect, Contractor, Manufacturer's Representative, and Installer.
- D. Agenda: Discuss and agree upon acceptable substrate and support conditions, preparatory work, interface with mechanical and electrical services, and methods of installation and testing.

1.12 PROJECT CONDITIONS

- A. Environmental Requirements: Comply with manufacturer's written requirements for installing sealants.
- B. Do not deliver or install casework until the following conditions have been met:
 - 1. Windows and doors are installed and the building is secure and weather-tight.

2. Ceiling, overhead ductwork and lighting are installed.
3. All painting is completed and floor tile is installed.
4. Do not deliver or install wood product until Interior building temperature is maintained between 65 and 80 degree F, and ambient relative humidity maintained between 25% and 55% prior to delivery, and during and after installation. Frequent and/or excessive changes in temperature and/or humidity levels during casework installation, or once casework is installed, must be avoided to prevent damage to materials.

1.13 SEQUENCING

- A. Sequence work under provisions of Division 1.
- B. Coordinate with plumbing rough-in requirements specified in Division 15.
- C. Coordinate with mechanical requirements specified in Division 15.
- D. Coordinate with electrical rough-in requirements specified in Division 16.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. The specific requirements shown and specified are indicated to establish a standard of design and quality for materials, construction, size and workmanship.
- B. Dimensions, voltages, electrical power requirements, and utility connections are based on the items specified. Contractor is responsible for all costs for dimensional adjustments and for providing or arranging for additional electrical or utility services or equipment required as a result of using an equal product.
- C. Acceptable Manufacturers. As noted for individual sections and as follows:
 1. Kewaunee Scientific Corporation, Statesville, NC
 2. Advanced Lab Concepts (ALC), Austin, TX
 3. Jamestown Metal Products, Inc., Jamestown, NY
 4. Lab Crafters, Ronkonkoma, NY

2.02 MATERIALS

- A. Solid Wood:
 1. Exposed solid wood: Maple hardwood lumber, clean and free of defect.
 2. Interior solid wood: Maple hardwood lumber, clean and free of defect.
 3. All lumber kiln dried to uniform moisture content of six percent.
- B. Exterior Plywood:
 1. Maple and hardwood (Maple faced poplar) Plywood: Balanced construction of cross and face plies glued with water resistant resin glue.

2. Maple Veneer: Plain sawn maple veneer, grade A, on all exposed faces. Vertically matched.
- C. Interior Plywood:
1. All interior plywood used in cabinets and cases, unexposed, shall be of same species and color as exterior plywood. All interior plywood shall have high grade, clear veneers and assembled with poly-vinyl emulsion glue. All interior unexposed shelves shall be 7-ply hardwood plywood, maple banded.
- D. Glue: Type 2 or Type 3 water resistant glue.
- E. Wood Finish: Highly chemical resistant catalyzed vinyl varnish finish with "blocker" additive to resist fading from sun light.
- F. Edgebanding: 1/8" hardwood on all edges of doors and drawers; fronts of shelves, base, wall, upper and tall cases.
- G. Epoxy Resin:
1. Modified epoxy resin compounded and cured for optimum physical and chemical resistant properties.
 2. Uniform mixture throughout full thickness.
 3. Non-glaring sheen.
 4. Color: Black.
 5. Countertop and back splash thickness: 1 inch.
 6. Slab flatness: No gap exceeding 0.09 inches in 96 inch span, measured in an unrestrained condition.
- H. Glass:
1. Type: Laminated safety glass.
 2. Color: Clear.
 3. Thickness: 1/4 inch nominal
 - a. Outer light: 1/8 inch
 - b. Plastic innerlayer: 0.030 inch polyvinylbutyral, clear
 - c. Inner light: 1/8 inch
- I. Epoxy Resin Cement:
1. Suitable for use in joining sections of epoxy resin countertop, backsplashes, and sinks.
 2. Sufficient adhesion properties at temperatures 40 degrees to 100 degrees Fahrenheit for permanently anchoring epoxy resin countertops to base cabinets.
 3. Chemical resistance equal to that specified for epoxy resin countertops and sinks.
 4. Loss of hardness and adhesion properties at temperatures in excess of approximately 140 degrees Fahrenheit.
- J. Silicone Sanitary Sealant: Comply with requirements specified in Division 7.
- K. Galvanizing Touch-up Paint: SSPC Paint 20.

- L. Sheet Carbon Steel:
 - 1. ASTM A568.
- M. High Strength low-alloy steel.
 - 1. Cold rolled, drawing quality, patent beveled and re-squared.
 - 2. Capable of structurally developing required strength and rigidity for each component part.
 - 3. Lead coated or treated with phosphate conversion coating.
- N. Sound Deadening: Heavy bodied resinous coating, with resilient filler material, compounded for permanent, non-flaking adhesion to metal in 1/8 inch thick coating.

2.03 COMPONENTS

- A. Epoxy Sinks:
 - 1. Material: Epoxy Resin.
 - 2. Construction: Taper side of sink. Inside corners radiused. Pitch bottom of sink to drain.
 - 3. Size: See drawings.
 - 4. Epoxy Sink Supports: Steel channels attached to sink cabinet ends and screw type adjustable rods to insure tight fit to underside of table with a water-proof compound.
 - 5. Seal around drain with silicone sealant as recommended by epoxy sink manufacturer, and as specified in Division 7.
- B. Sink Strainer, Overflows, and Tailpieces:
 - 1. Sink strainer, overflows, and tailpieces:
 - a. Epoxy Sinks: Polypropylene. Coordinate tailpiece termination with service line connection requirements.
 - b. Stainless Steel Sinks: See Division 15.
- C. Epoxy Resin Countertops and Back Splashes:
 - 1. Fabricate from epoxy resin unless otherwise noted in drawings.
 - 2. Provide back splashes at rear of countertop and on end returns where indicated; notched as required.
 - 3. Fabricate to install without field cutting or drilling. Drill holes in counter for laboratory service fixtures as scheduled in Section 12309.
 - 4. Seal gap between back splash and wall with acrylic latex sealant specified in Division 7.
 - 5. Joint between segments of tops and back splashes:
 - a. Smooth, even, and level with no raised edges
 - b. Width: 1/8 inch maximum
 - c. Seal watertight with modified epoxy resin cement
 - 6. Epoxy Resin countertops:
 - a. Cut to size of cabinet or knee space below, where indicated on drawing. Where no indication is made, countertops lengths shall be at Contractor's option with termination points at base cabinet or knee space edges.
 - b. Do not cut to be smaller than 24 inches wide.
 - c. Fabricate with drip grooves on underside of exposed edges.

- d. Fabricate exposed edges of base sections of countertops with a 1/4 inch chamfer on front top edge, square bottom edge, and vertical corners; fabricate other countertop edges with square tops and bottoms.
- e. Bond back splash to surface of countertop to form square joint.
- f. Back splash to be 4 inches high, unless otherwise noted on Drawings.

D. Peg Boards:

- 1. Constructed of modified epoxy resin.
- 2. Thickness: 1 inch.
- 3. Color: Black for full thickness to match adjacent counter tops.
- 4. Polish front surface, back surface, and edges.
- 5. Fabricate with:
 - a. Removable round-tip polypropylene peg section. Omit bottom row as required to avoid conflict with faucets.
 - b. Stainless steel drip trough with 1/4 inch diameter outlet below peg area.
 - c. Flexible clear tubing between drip trough outlet and sink (cut as required).
- 6. Mechanically fasten drip trough to pegboard and continuously seal with sanitary silicone specified in Division 7 at top edge.

E. Hardware and Trim:

- 1. Drawer and Door Pulls:
 - a. Drawer and door pulls shall be satin finish stainless steel wire pulls, and shall be securely fastened to doors and drawers with vandal-proof screws. Two pulls shall be required on all drawers over 24 inches long. Drawer pulls shall be mounted horizontally. Door pulls shall be mounted vertically.
- 2. Drawer Suspension:
 - a. Provide self-closing, full-extension, heavy duty drawers' suspension. Loading capacity of 150 lbs.
- 3. Drawer Stops:
 - a. Provide on drawers to prevent inadvertent removal.
- 4. Hinges:
 - a. Hinges shall be the five (5) knuckle institutional, wrap-around full overlay design for all swinging doors. Hinges shall be 2-1/2" long, one (1) pair for doors under 4 ft in height and 1-1/2 pair on doors over 4 ft in height. Hinges shall be mounted with flathead screws, so applied to door and cabinet to withstand a weight load of 150 lbs. minimum. All hinges shall be satin finish stainless steel.
- 5. Locks:
 - a. Locks shall be a National lock, pin tumbler with heavy-duty interchangeable cylinder. Exposed lock noses shall be dull nickel (satin) plated and stamped with identifying numbers. Locks shall have capacity of at least 1000 primary key changes.
 - b. Provide locks where noted on lab plans.
 - c. Keying:
 - 1) Key locks individually; two keys per lock.
 - 2) Master key locks by lab suite; two keys per suite.
 - 3) Provide two grand master keys for locks
- 6. Roller Catches:

- a. Roller catches shall be used on swinging doors. Catches shall have a spring-loaded polyethylene roller and provided with a steel strike plate. Double-doors, without looks shall have a catch on each door. Full height cases shall have latching devices located on the structurally fixed center shelf. The left hand door shall have a positive catch and the right hand door shall have the roller type catch.
- 7. Elbow Catches:
 - a. Elbow catches and strike plates shall be used on left hand doors of double door cases and are to be cast aluminum with bronze finish.
- 8. Leg Shoes:
 - a. Leg shoes shall be provided on all table legs, unless otherwise specified, to conceal leveling device. Shoes shall be 2-1/2" high and a pliable, black vinyl material. Use of a leg shoe which does not conceal leveling device will not be acceptable.
- 9. Shelf Support Clips:
 - a. Shelf support clips for wood casework shall be pin type for mounting on interior of cabinet work. Clips shall be corrosion resistant and shall retain shelves from accidental removal. Shelves shall be adjustable on 1-1/4" centers. Surface mounted metal support strips and clips subject to corrosion are not acceptable.
- 10. Fasteners and Anchors:
 - a. Size and type to securely fasten and anchor items to substrates and supporting structure.
- F. Stationary Cylinder Holder:
 - 1. Stationary cylinder holder shall be designed to safely secure cylinders. Holder shall be made with a reinforced polypropylene wall bracket designed to hold standard gas cylinders, ranging in size from 3" to 14" diameter. Shall come equipped with a 1" nylon strap with pinch clasp and 36" spring-loaded steel safety chain with clip that adjusts around the cylinder.

2.04 FINISH AND PERFORMANCE REQUIREMENTS

- A. Wood Finish and Performance Requirements:
 - 1. Wood Finish:
 - a. Prior to application of the wood finish, case and cabinet surfaces shall be smoothly sanded to remove loose fibers, scratch marks and abrasions, with all dust thoroughly removed by compressed air.
 - 2. Wood Finish Application:
 - a. Finishes shall be applied under controlled atmospheric conditions, and shall be cured after application in a modern humidified oven humidified at 140° F and 30%- relative humidity.
 - 3. Wood Casework Finish (Interiors):
 - a. Interior surfaces and unexposed exteriors shall receive a double-pass coat of resinous wood sealer.
 - 4. Wood Casework Finish (Exteriors):
 - a. Case and cabinet exposed exterior surfaces, including interiors of glazed cases and open shelving, shall be provided with an acid, alkali, solvent, water and abrasion resistant finish. Surfaces shall be first coated with a non-fiber lifting stain, or toner to secure the desired color. The color coat shall be thoroughly

dried. The first sealer coat shall be applied, thoroughly dried, sanded and carefully dusted. A second sealer coat shall be applied and thoroughly dried. A double pass coat of chemical resistant synthetic varnish shall then be applied and thoroughly dried, providing a semi-gloss finish. The completed case and cabinet exterior finish shall meet the performance test requirements specified under PERFORMANCE TEST RESULTS.

5. Performance Test Rating: Terms referred to in PERFORMANCE TEST RESULTS are as follows:
 - a. "A" (Excellent) - Indicates excellent to superior integrity of finish film. Includes no effect to slight allowable change in gloss (dulling or increase in gloss) and slight discoloration.
 - b. "B" (Good) - Indicates good to very good integrity of finish film. Allows change of gloss or discoloration. Any effect can be removed from the tested area by abrading with 325-mesh silica powder and water, indicating that the discoloration is only superficial and that the finish film is good below the surface.
6. Performance Test Results (Chemical Spot Tests):
 - a. Chemical spot tests shall be made by applying 5 drops of each reagent to the surface to be tested. Each reagent (except those marked **) shall be covered with a 1-1/4" dia. watch glass, convex side down to confine the reagent. Spot tests of volatile solvents marked ** shall be tested as follows: A 1" ball of cotton shall be saturated with solvent and placed on the surface to be tested. The cotton ball shall then be covered by an inverted 2-ounce wide mouth bottle to retard evaporation. All spot tests shall be conducted in such a manner that the test surface is kept wet throughout the entire test period, and at a temperature of 77° F +/- 3° F. At the end of the test period, the reagents shall be flushed from the surface with water, and the surface scrubbed with a soft bristle brush under running water, rinsed and dried. Volatile solvent test areas shall be cleaned with cotton swab soaked in the solvent used on the test area. Immediately prior to evaluation 16 to 24 hours after the reagents are removed, the test surface shall be scrubbed with a damp paper towel and dried with paper towels.

Reagents	Time In Minute	Test Ratings
Acetone**	60	A
Ammonium Hydroxide, 28%	60	A
Benzene**	60	A
Carbon Tetrachloride**	60	A
Ethyl Acetate**	60	A
Ethyl Alcohol**	60	A
Ethyl Ether**	60	A
Gasoline**	60	A
Glacial Acetic Acid, 99%	60	A
Hydrochloric Acid, 37%	60	A
Methanol**	60	A
Methyl Ethyl Ketone**	60	A
Naphtha**	60	A
Nitric Acid, 30%	60	A
Phosphoric Acid, 75%	60	A

Potassium Hydroxide, 40%	60	A
Sodium Hydroxide, 40%	60	A
Sodium Hydroxide, 10%	60	A
Sulfuric Acid, 70%	60	A
Toluene**	60	A

* Where concentrations are indicated, percentages are by weight.

** Indicates these solvents tested with cotton and jar method

7. Performance Test Results (Heat Resistance):
 - a. Hot water (190° F - 205° F) shall be allowed to trickle on the finished surface, which shall be set at an angle of 45° from horizontal for a period of 5 minutes. After cooling and wiping dry, the finish shall show no visible effect from the hot water treatment.
8. Performance Test Results (Moisture Resistance):
 - a. A cellulose sponge 2" x 3" x 1" shall be soaked with water and placed on the finished surface for a period of 100 hours. The sponge shall be maintained in a wet condition throughout the entire test period. At the end of the test period, the surface shall be dried and no visible effect shall be shown on the finish.
9. Performance Test Results (Impact Resistance):
 - a. A 1-lb. ball (approximately 2" dia.) shall be dropped from a distance of 1-ft. onto the finished surface of a 3/4" thick plywood panel supported underneath by a solid surface. There shall be no evidence of cracks or checks in the finish due to impact upon close examination.

B. Metal Finish and Performance Requirements:

1. Stainless Steel Finish: Number 4.
2. Carbon Steel:
 - a. Backed-on acid, alkali, and solvent resistant finish; highly resistant to corrosion, chemical activity, and abrasion; flexible, hard, and smooth
 - b. Finishing sequence:
 - 1) Prior to application of finish, carefully inspect each item and make ready for metal treatment and finish application
 - 2) Thoroughly clean and remove oil, grease, harmful matter, and rust spots
 - 3) Perform by cleaning solvent or by alkaline bath washing and spraying
 - 4) Hard wiping is not permitted
 - 5) Process to receive finish coats
 - 6) Pass metal parts through paint chamber where epoxy powder coating is applied
 - 7) Bake coating for appropriate time period to insure complete polymerization
3. Dry-film thickness: Minimum 1.2 mils minimum; without "orange-peel", sags, runs and over spray.
4. Cured films impact resistance:
 - a. Unaffected by 3.2 N*m (28 inch-pound impact or 1/2 inch mandrel bend when supported on 18 gage steel panel
 - b. Pencil hardness of 8H to 9H
5. Polymerized film chemical resistance. Resist action of following reagents without effect other than loss of luster or slight discoloration when subjected to a one milliliter puddle test for one hour:

Acetic Acid: 1% to glacial
Sulfuric Acid: 25%
Sulfuric Acid: 50%
Sulfuric Acid: 85%
Hydrochloric Acid: 10%
Hydrochloric Acid: 37%
Nitric Acid: 10%
Nitric Acid: 25%
Nitric Acid: 60%
Phosphoric Acid: 85%
Perchloric Acid: 60%
Formaldehyde: 37%
Phenol: 854%
Ammonium Hydroxide Concentrate
Carbon Tetrachloride
Chloroform
Acetone
Xylol
Furfural

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine conditions and proceed with work in accordance with specifications.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's printed instructions and approved shop drawings.
- B. Install items plumb, level, square, and free from warp and twist.
- C. Maintain dimensional tolerances and alignment with surrounding construction and adjacent surfaces.
- D. Install miscellaneous filler panels and scribes for a continuous tight-fitting assembly without gaps and spaces between cabinets, counters, service chase, and adjoining surfaces.
- E. Seal backsplashes at wall surfaces.
- F. Interface With Other Work. Install items in a sequence to not delay:
 - 1. Adjoining construction
 - 2. Connections of casework and hoods to mechanical and electrical services

3.03 ADJUSTING

- A. Adjust parts for smooth, uniform operation.

3.04 CLEANING

- A. Comply with manufacturer cleaning instructions.

- B. Do not use materials and methods, which may damage finish and surrounding construction.

3.05 PROTECTION

- A. Protect finished work.
- B. Advise contractor of procedures and precautions for protection of material, installed laboratory casework and fixtures from damage by other trades.
- C. Post casework completion notices to alert other trades to the potential damage to completed work as required.

END OF SECTION 12340